Air Force Institute of Technology (AFIT), Wright-Patterson AFB, Ohio

1. **General/Admissions**. Advanced degrees at the Air Force Institute of Technology are pursued through the Graduate School of Engineering; Department of Operational Sciences. Masters of Science Degrees are offered in both Operational Analysis (GOA) and in Operations Research (GOR). A PhD is offered in Operations Research. The following is a list of admission policies for students entering AFIT:

a. Candidates must have a bachelor's degree from an accredited United States institution or proof of equivanlent training at an institution outside the United States.

b. Candidates must have a grade point average of 3.0 or better in upper-division work (junior-senior level) and in any graduate work already completed.

c. Candidates must have a combined score on the Graduate Record Exam (GRE) of at least 1100 (minimum of 600 quantitative, 500 verbal).

d. Candidates should have an undergraduate degree with a major in a quantitative subject (Math, Engineering, Science, Physics, etc.).

e. There are no specific application deadlines. Both programs begin in August of each year.

f. Points of contact for admissions are:

Lt Col Jim Moore (USAF) DSN 785-6565 X4337; Comm (513) 255-6565 X4337
LTC Jack Kloeber (US Army) DSN 785-6565 X4336
or jkloeber@afit.af.mil/jtmoore@afit.af.mil
Link to AFIT School of Engineering (Department of Operational Sciences) Web Page.

2. **Masters Program Guidance - Operations Research (GOR).** The GOR program requires 18 months (6 academic quarters) of full-time study and begins in August of each year. The purpose of the program is to educate military officers in the theory and practise of operations research, with emphasis on the application of quantitative analysis techniques to defense decision making. Specific topics of study include mathematical modeling, simulation, statistical analysis, and optimization. the program is continuously reviewed by the users of program graduates. To qualify for the Masters of Science degree, all GOR students must develop a foundation in fundamental operations research methods and associated disciplines. This objective is accomplished through satisfaction of the following **core course** requirements:

Hrs.
Probabilistic Operations Research (OPER 540) 4
Simulation (OPER 560 or OPER 561) 4
Linear Programming (OPER 610) 4
Mathematics (MATH 501, MATH 502) 8
Statistics (STAT 537, STAT 696) 8

Students who have previously taken comparable graduate courses may request action through their faculty advisor for transfer credit or waiver of specific courses. Under appropriate circumstances, course substitutions may be approved by the ENS Department Head.

At least three electives should be selected from courses in one of the **specialty areas** described below. Other courses may be substituted with the approval of the GOR Program Director.

Deterministic Operations Research

OPER 612 Nonlinear Programming
OPER 613 Integer Programming
OPER 615 Large Scale Systems Optimization
OPER 616 Graph Theory
OPER 617 Networks and Combinatorial Optimization
OPER 621 Multicriteria Decision Making
OPER 622 Modeling Transportation Systems
OPER 626 Scheduling Theory
OPER 628 Analysis of Algorithms with OR Applications
OPER 629 Project Management
OPER 710 Advanced Linear Programming and Extensions
OPER 712 Advanced Mathematical Programming

Probabilistic Operations Research

OPER 641 Applied Stochastic Processes
OPER 645 Decision Analysis
OPER 646 Decision and Risk Analysis
OPER 647 Queueing System Analysis

OPER 649 Decision Analysis Practise
OPER 745 Advanced Decision Analysis
OPER 747 Queueing Networks
STAT 687 Mathematics of Reliability Theory 1
STAT 697 Mathematics of Reliability Theory 2

Simulation

CSCE 582 Virtual Environments
CSCE 682 3-D Computer Graphics
OPER 660 Simulation Modeling and Analysis
OPER 683 Response Surface Methodology
OPER 685 Applied Multivariate Data Analysis
OPER 760 Advanced Simulation

Applied Statistics

OPER 681 Statistical Process Control
OPER 683 Response Surface Methodology
OPER 684 Quantitative Forecasting Techniques
OPER 685 Applied Multivariate Data Analysis
OPER 687 Analysis and Modeling of Spatial-Temporal Information
OPER 689 Design of Experiments for Quality Improvement
STAT 694 Design of Experiments
STAT 737 Introduction to Multivariate Statistics

Operational Modeling

EENG 574 Introduction to C3 and Principles of Electronic Warfare
LOGM 595 Logistics Models and Policy Decisions
NENG 597 Nuclear Weapons Effects, Technology and

Non-proliferation
OPER 595 Issues in Defense Analysis
OPER 622 Modeling Transportation Systems
OPER 671 Joint Combat Modeling 1
OPER 672 Joint Combat Modeling 2
OPER 674 Joint Mobility Modeling
SENG 564 Conventional Weapons Effects
Effective operations research analysts must be able to structure a problem, integrate analytical techniques, apply current technical literature, and communicate insights. Students refine these skills through 12 quarter hours of independent study, culminating in the submission and oral defense of a major research report (thesis). Detailed information on thesis objectives, requirements, and evaluation is available in the ENS document, Policy on Master's Thesis Research. Full time students are expected to carry an average course load of at least 12 credit hours per quarter. Hence, students enrolled in a six quarter program should accumulate at least 72 hours (excluding seminars and short term courses).

3. Masters Program Guidance - Operations Analysis (GOA). The GOA program is eighteen months (six academic quarters) long and also begins with a month long review session in August of each year. The program is directed by the Department of Operational Sciences in the AFIT Graduate School of Engineering (AFIT/ENS). This program prepares military officers with operational backgrounds to conduct analysis of military forces. The

program provides students with a strong foundation of quantitative analysis methods. Areas of study include probability, statistics, mathematics, operations research, modeling and simulation, and joint combat modeling. The program also includes an application sequence. Based on student interests and military needs, students take courses in a Modeling and Simulation Sequence or in an Operational Effectiveness Sequence. Subjects in the M&S Sequence include computer databases, computer communication networks, and advanced joint combat modeling or joint mobility modeling. Subjects in the Operational Effectiveness Sequence include cost analysis for system design; conventional weapons effects or nuclear weapons effects, technology, and non-proliferation; and communications, command and control, and the principles of electronic warfare. Specific program requirements are tailored to the individual student.